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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
TUROCY, DAVID P	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 10/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/726,361	SKOOG ET AL.	
	Examiner	Art Unit	
	David Turocy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The declaration under 37 CFR 1.132 filed 9/18/2006 is insufficient to overcome the rejection of claims based upon 35 U.S.C. 103(a) as set forth in the last Office action because: the declaration, while claiming unexpected results for a Inconel 625 substrate, is not commensurate in scope with the present claims because the claims only require a metallic substrate. A single disclosed species of metal is not a representative number of metal substrates to support the claim on all metallic substrates.

Additionally, the declaration states that sputtering is a technique use to apply reflective coating mixture over a superalloy previous to the use of the techniques disclosed in the claims. Also, the declaration states (see paragraph 8) that the test results (Figures 1 and 2) show that a reflective coating applied by the techniques as claimed cannot be considered "conventional" method of application. However, such a statements are not supported by any factual evidence and therefore is deemed moot. It is unclear how figures 1 and 2 show that the claimed techniques can not be considered a "conventional" method of application.

The declaration provides data to support the statement as to the sputtered material on the coupon, see paragraph 7 and Figures 1-2. However, all other arguments appear to contain only opinion that is not supported by factual evidence. It is well settled that arguments unsupported by competent factual evidence of record are entitled to little weight. *In re Payne, 606 F.2d 303,315,* 203 USPQ 245,256 (CCPA 1979).

Finally, the data supplied in the declaration and the data supplied in the specification do not compare same reflective coating on the same substrate. The reflective coating in the specification is deposited on Rene 41 ® alloy and the sputtered coating is deposited on Inconel 625 alloy and therefore the differences in duration and magnitude may not be attributed to the method of deposition.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-2, 4, 6-10, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer.

Nagaraj et al. teaches a method of applying a heat reflecting on a nickel-based superalloy component of a gas turbine engine by applying a ceramic thermal barrier coating onto the substrate by plasma spraying and then applying the heat reflecting layer of gold or platinum on the thermal barrier coating (Col. 3, line 26-Col. 4, line 24). It is the examiners position that the ceramic thermal barrier coating dries prior to application of the heat reflective coating. Nagaraj et al. does not teach the claimed method of applying the heat-reflecting layer. However, Nagaraj et al. teaches that the heat-reflecting layer can be applied by any conventional deposition technique (Col. 3, lines 49-57). Klabunde teaches forming a reflective metal layer, such as a gold or platinum layer, on a substrate by forming a dispersion of metal particles and organic solvent carrier, applying the dispersion to a substrate and then heating/firing to form the metal layer, where the dispersion can be applied by spraying (Col. 3, lines 35-65; Col. 6, lines 30-54).

Nagaraj et al. in view of Klabunde does not teach the spraying is an air assisted spraying technique. However, using air to atomize and project a spray for coating a substrate is well established in the art, as shown by Kirk-Othmer. (see page 672, Table 1, page 688, Table 2), and hence would have been an obvious method of spraying the heat-reflective coating because of the expectation of successfully forming the reflective layer. In addition, it is the examiners position that the application method taught by Kirk-Othmer are "capable" of being applied at the claimed conditions and such a recitation

does not require such temperature and pressure during the application of the coating mixture.

It would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer on a gas turbine engine.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach the claimed amount of reflective coating mixture and thermal barrier coating applied to the substrate. However, it is the examiners position that the amount of these coatings applied to the turbine component are known result effective variables, as not enough of these coatings applied to the component would not provide the desired heat reflectance and thermal barrier properties, and too much would not offer additional benefits of increased heat reflectance and thermal properties.

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to determine an optimal coating amount for the heat reflective layer and the thermal barrier layer, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, through routine experimentation, to provide the desired heat reflecting and thermal barrier properties for the turbine component.

5. Claim 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer as applied to claim 1 above, and further in view of Driver.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach supplying a metallic gas turbine component comprising cobalt-base superalloy or titanium alloy. Nagaraj et al. teaches of a coating on a nickel-base superalloy, but suggests that other suitable high temperature materials could also be used (Column 3, lines 31-32). Driver teaches of an application of ceramic onto a turbine blade, where the coating is suitable for substrates of nickel and cobalt superalloys, stainless steel and titanium alloy.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer to use the cobalt-based superalloy or titanium alloy suggested by Driver to provide a desirable ceramic coating to a metallic substrate because Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer teaches of applying a ceramic to a nickel-based superalloy or other high temperature materials and Driver teaches cobalt-base superalloy or titanium alloy are known in the art to be alternatives to nickel-based alloy.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer as applied to claim 9 above, and further in view of Vakil.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach the claimed thermal barrier layer material containing lanthanum or cerium. Vakil teaches a nickel-based superalloy gas turbine engine component having a ceramic thermal barrier coating, where the coating can include cerium (Col. 6, lines 1-25).

It would have been obvious to one skilled in the art at the time the invention was made to use the ceramic thermal barrier coating material of Vakil, including the cerium component, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer with the expectation of providing suitable thermal barrier properties, as shown by Vakil for nickel-based superalloy gas turbine engine components.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer as applied to claim 9 above, and further in view of Eppler.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach that the ceramic thermal barrier coating is applied by air assisted spraying. However, Eppler teaches breaking down a ceramic into fine particles and air assisted spraying them onto a substrate (Page 955, Column 3).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer to use the air assisted spray technique suggested by Eppler to provide a desirable ceramic coating on a substrate Eppler teaches air-assisted spraying is known in the art to provide ceramic coatings onto a substrate.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer as applied to claim 1 above, and further in view of Demaray.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach polishing in the component prior to applying the thermal barrier coating. Demaray teaches polishing a nickel-based superalloy component prior to application of a thermal barrier layer, in order to achieve a desired surface roughness (Col. 2, line 49-Col. 3, line 5). One skilled in the art would have recognized that such polishing/roughening is conventionally used for enhancing the adhesion of subsequently applied coatings to a metal substrate.

Therefore, it would have been obvious to one skilled in the art to polish the nickel-based superalloy component of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, prior to applying the coatings, in order to enhance the bonding of the coatings to the metal components, since polishing of superalloys prior to coating to enhance coating adhesion is disclosed by Demaray.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer as applied to claim 1 above, and further in view of Rigney et al.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach pre-oxidizing the component prior to applying the thermal barrier coating. Rigney et al. teaches oxidizing a nickel-based superalloy component of a gas turbine engine in order to enhance the bonding between the superalloy and subsequently applied coatings (Col. 1, lines 7-10; Col. 6, lines 15-40).

It would have been an obvious modification, for one skilled in the art, to Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer to oxidize the nickel-based superalloy, in order to enhance the bonding between the superalloy and subsequently applied coatings, as is target by Rigney et al.

10. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer as applied to claim 1 above and further in view of Demaray, and Rigney et al.

Nagaraj et al., Klabunde, Kirk-Othmer, Demaray, and Rigney et al. are applied here for the same reasons as given above.

It would have been obvious to one skilled in the art at the time the invention was made to polish and oxidize the nickel-based superalloy component of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, prior to applying the coatings, in order to optimize the bonding of the coatings to the metal components, since both polishing and oxidizing of superalloys prior to coating are known to increase coating adhesion as disclosed by Demaray and Rigney et al. Please note that the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183).

11. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and Kirk-Othmer as applied to claim 1 above, and further in view of Tecle.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach of providing a reflective-coating mixture with a noble metal encapsulator. Tecle teaches of a method for forming a palladium, silver, gold or platinum in an organic carrier (Column 3, lines 25-35). Tecle discloses utilizing an encapsulant material to limit the required amount of solvent (Column 4, lines 59-67). Tecle utilizes a metallic colloidal solution with fluxing agents to coat ceramics, metals, and ceramic/metal composites (Column 7, lines 10-31).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer to use a solution containing a metal encapsulant and fluxing agent as taught by Tecle to provide a desirable metallic coating because Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer teaches using a metallic pigment in an organic solvent for coating a surface and Tecle teaches a metal encapsulant reduces the large amount of solvent required when coating a ceramic or metal substrate and fluxing agents are provide enhanced adherence of a coating to a substrate.

12. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer as applied to claim 1 above, and further in view of Akechi.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer does not teach a reflective coating mixture containing a glass or ceramic comprising up to 25 wt% of the reflective mixture. Akechi teaches of using glass frit and noble metal dispersion in an organic vehicle to from a coating (Abstract). Akechi discloses using 1-3 wt % glass frit and 37-59 wt % noble metal powder in a 40-60 wt % organic vehicle (abstract). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made if the overlapping portion of the range as disclosed by the reference were selected because overlapping ranges have been held to be prima facie case of obviousness. See In re Wortheim 191 USPQ 90. In

addition, Akechi clearly discloses including the filler material to provide passage for gas material at time of heating, so that the gas can easily pass through the passage to the surface (Page 4). Akechi goes on to say that film bulging and film tearing due to any residual gas can be completely prevented (Page 4). In addition, Klabunde teaches a of applying a metal coating on a substrate includes forming a dispersion of metal particles and organic carrier, spraying the dispersion to the substrate, and finally heating/firing to form the metal layer (Col 3, lines 35-65; Col 6, lines 30-54). Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. to use the glass frit/noble metal in an organic vehicle taught by Akechi to reap the benefits of providing a passage of gas for residual gases in the film to completely prevent film bulging and tearing upon heating.

13. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde, Kirk-Othmer, Demaray, Rigney et al., and Eppler.

Nagaraj et al., Klabunde, Kirk-Othmer, Demaray, Rigney et al., Eppler are applied here for the same reasons as given above.

It would have been obvious to one skilled in the art at the time the invention was made to modify Nagaraj et al. by incorporating spraying as taught by Klabunde and particularly air-assisted spraying as taught by Kirk-Othmer for turbine engine components, and further incorporate polishing and oxidizing to improve coating

adhesion as taught by Demaray and Rigney et al. and to air assist spray the ceramic layer as taught by Eppler because the combination of the references provides known and conventional steps in coating a turbine component to maximize properties and coating adhesion.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy

AU 1762

TIMOTHY MEEKS
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